

FIG.3

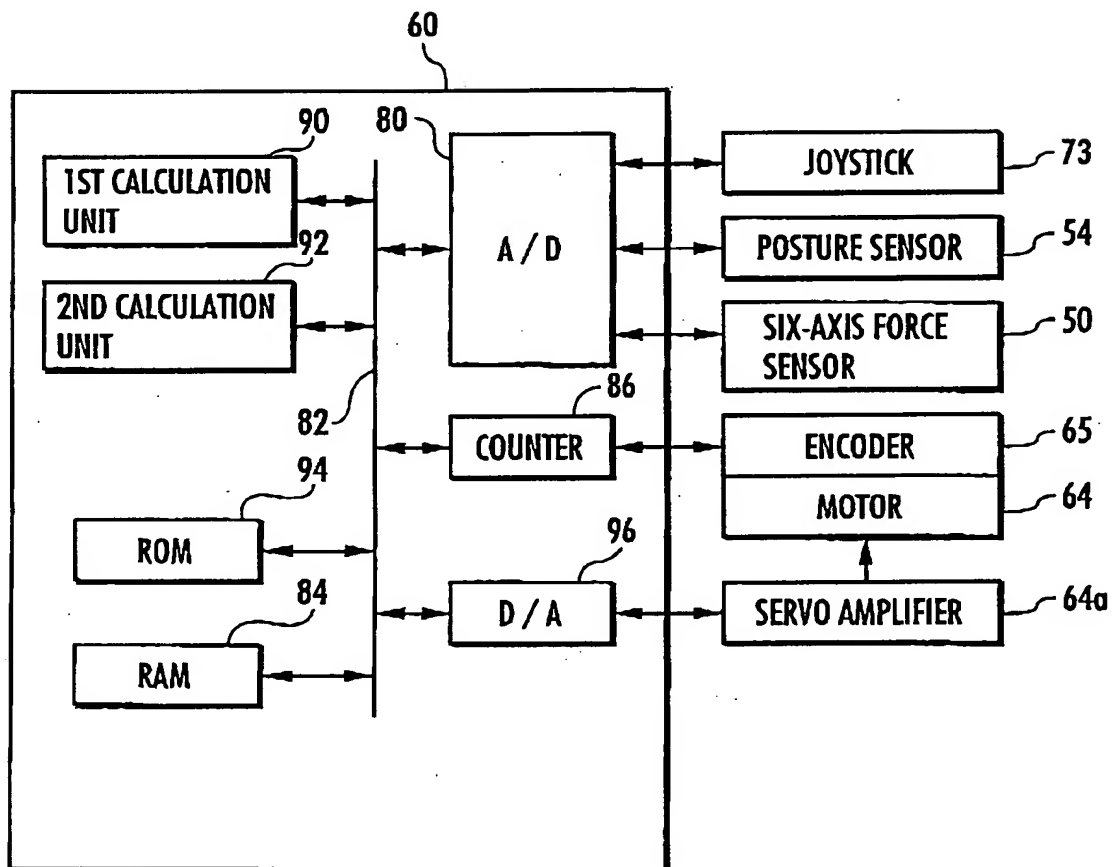


FIG.16

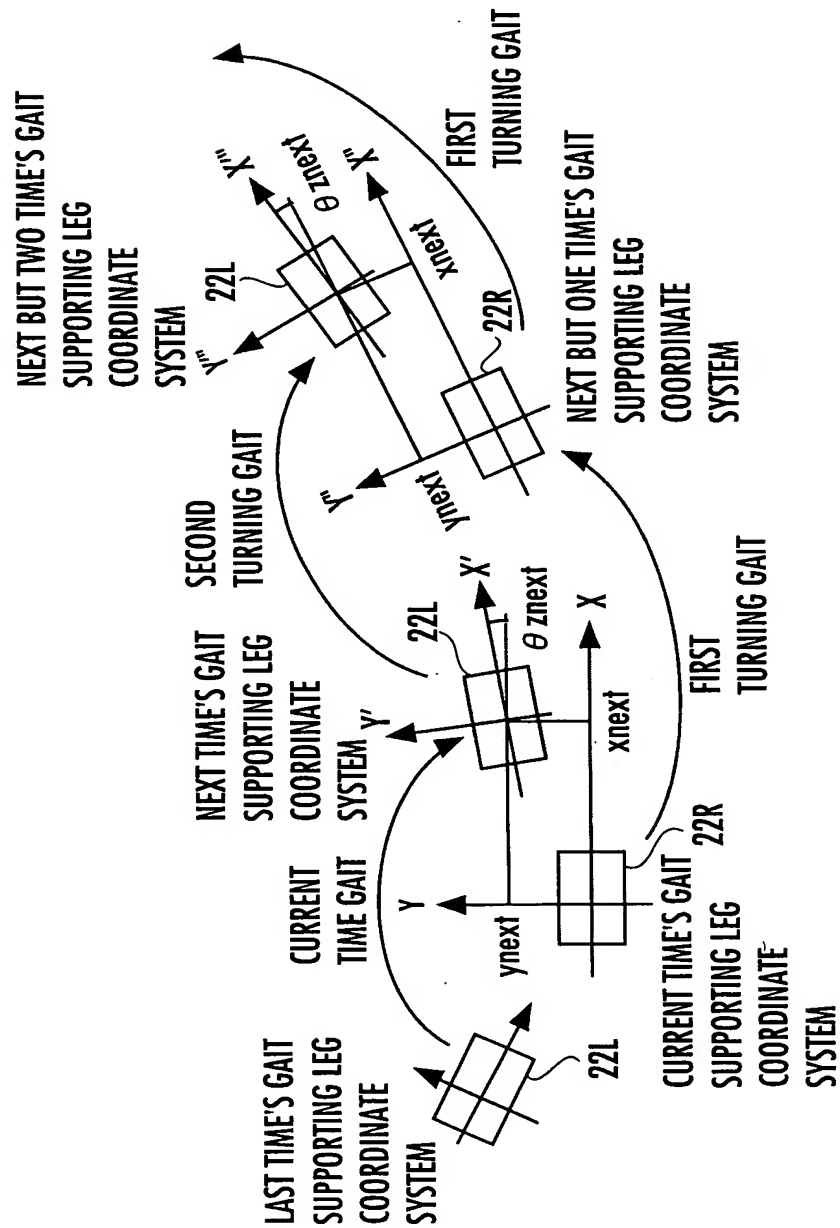


FIG.17

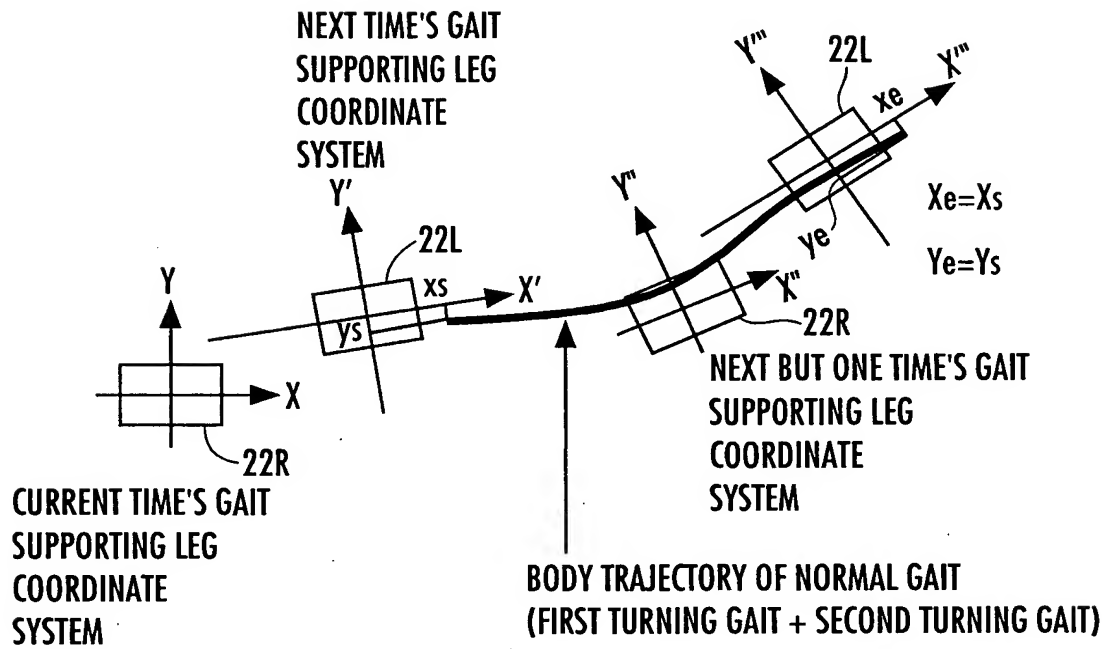


FIG.42

ENTRY

S702
CALCULATE PROVISIONAL CURRENT TIME GAIT UNTIL END TIME ON THE BASIS OF PROVISIONAL DESIRED ZMP AND OTHER CURRENT TIME GAIT PARAMETERS.

S704
DETERMINE TERMINAL DIVERGENT COMPONENT $q0[k]$ ACCORDING TO THE FOLLOWING EQUATION FROM BODY POSITION/VELOCITY (X_e, V_{xe}) AT END OF CURRENT TIME GAIT.

$$q0[k] = X_e + V_{xe} / \omega_0$$

S706
DETERMINE TERMINAL DIVERGENT COMPONENT ERROR $errq$ ACCORDING TO THE FOLLOWING EQUATION:
 $errq = q0[k] - q''$

S700

S708 yes

LEAVE REPETITION LOOP

 ∞ IS $errq$ WITHIN PERMISSIBLE RANGE?

S710

S712
CALCULATE PROVISIONAL CURRENT TIME GAIT UNTIL END TIME ON THE BASIS OF DESIRED ZMP OBTAINED BY ADDING CORRECTION TO PROVISIONAL DESIRED ZMP ACCORDING TO RELATIONSHIP OF FIG. 44, ASSUMING THAT $\alpha = \Delta \alpha$.

DETERMINE TERMINAL DIVERGENT COMPONENT $q1[k]$ ACCORDING TO THE FOLLOWING EQUATION ON THE BASIS OF BODY POSITION/VELOCITY (X_{e1}, V_{xe1}) AT END OF CURRENT TIME GAIT RECALCULATED ON THE BASIS OF DESIRED ZMP TO WHICH CORRECTION HAS BEEN ADDED:

$$q1[k] = X_{e1} + V_{xe1} / \omega_0$$

S714
DETERMINE PARAMETER SENSITIVITY r ACCORDING TO THE FOLLOWING EQUATION:

$$r = (q1[k] - q0[k]) / \Delta \alpha$$

S716
ADD CORRECTION AMOUNT BASED ON $\alpha = -errq/r$ TO PROVISIONAL DESIRED ZMP TO PROVIDE UPDATED PROVISIONAL DESIRED ZMP.

S718

DETERMINE BODY INCLINATION RESTORING MOMENT ZMP-CONVERTED VALUE PATTERN ON THE BASIS OF DIFFERENCE BETWEEN TERMINAL BODY POSTURE ANGLE OF PROVISIONAL CURRENT TIME GAIT AND INITIAL BODY POSTURE ANGLE OF NORMAL GAIT AND DIFFERENCE BETWEEN TERMINAL BODY POSTURE ANGULAR VELOCITY OF PROVISIONAL CURRENT TIME GAIT AND INITIAL BODY POSTURE ANGULAR VELOCITY OF NORMAL GAIT.

S720
DETERMINE, AS DESIRED ZMP PATTERN, THE PATTERN OBTAINED BY ADDING BODY INCLINATION RESTORING MOMENT ZMP-CONVERTED VALUE PATTERN TO PROVISIONAL DESIRED ZMP PATTERN.

S722

DETERMINE ANTIPHASE ARM SWING RESTORING ANGULAR ACCELERATION PATTERN ON THE BASIS OF DIFFERENCE BETWEEN TERMINAL ANTIPHASE ARM SWING ANGLE OF PROVISIONAL CURRENT TIME GAIT AND INITIAL ANTIPHASE ARM SWING ANGLE OF NORMAL GAIT AND DIFFERENCE BETWEEN TERMINAL ANTIPHASE ARM SWING ANGULAR VELOCITY OF PROVISIONAL CURRENT TIME GAIT AND INITIAL ANTIPHASE ARM SWING ANGULAR VELOCITY OF NORMAL GAIT.

RETURN

FIG.43

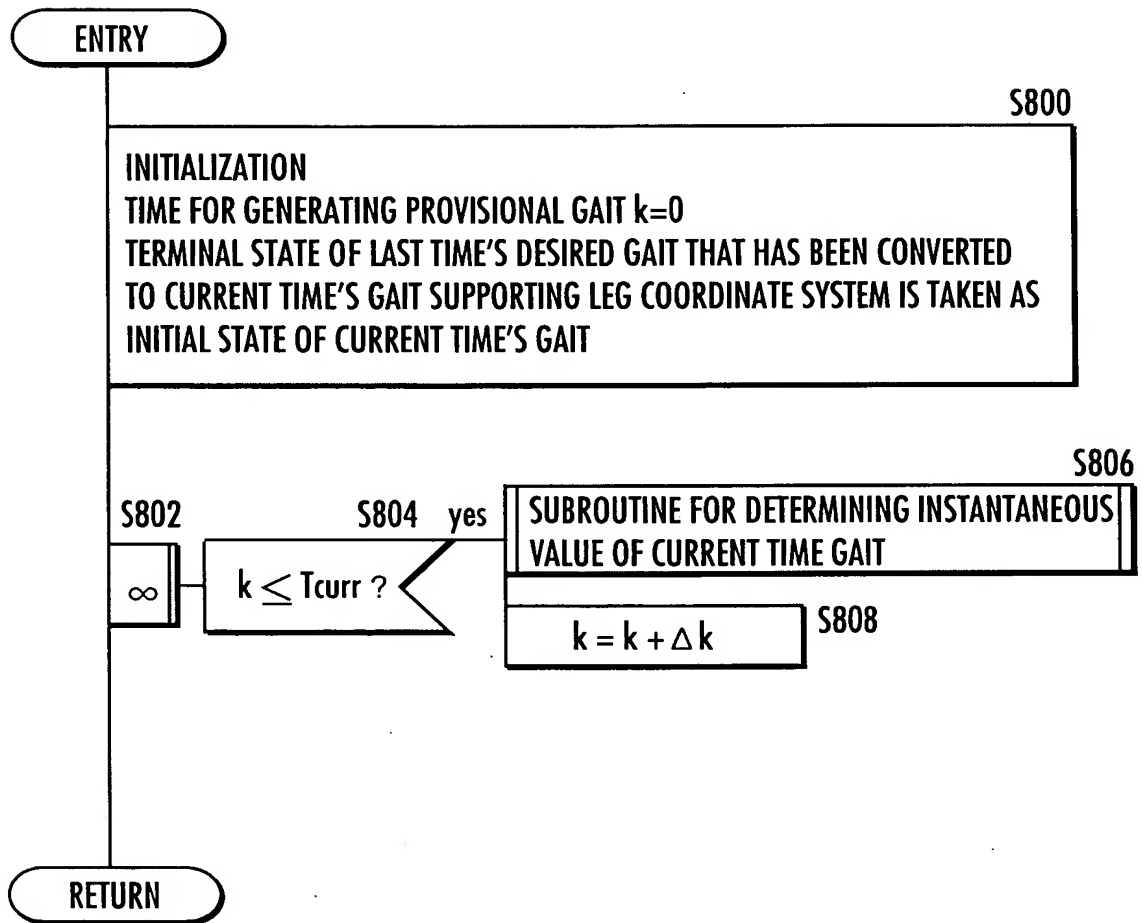


FIG.62

ENTRY

DETERMINE DIFFERENCE IN HORIZONTAL BODY POSITION BETWEEN MODELS, S2200
WHICH IS THE DIFFERENCE BETWEEN HORIZONTAL BODY POSITION OF
CORRECTED GAIT AND HORIZONTAL BODY POSITION OF ORIGINAL GAIT.

DETERMINE DIFFERENCE IN BODY POSTURE INCLINATION ANGLE BETWEEN MODELS, S2202
WHICH IS THE DIFFERENCE BETWEEN BODY POSTURE INCLINATION ANGLE OF CORRECTED
GAIT AND BODY POSTURE INCLINATION ANGLE OF ORIGINAL GAIT.

DETERMINE DIFFERENCE IN ANTIPHASE ARM SWING ANGLE BETWEEN MODELS, S2204
WHICH IS THE DIFFERENCE BETWEEN ANTIPHASE ARM SWING ANGLE OF
CORRECTED GAIT AND ANTIPHASE ARM SWING ANGLE OF ORIGINAL GAIT.

DETERMINE REQUIRED VALUE OF MODEL HORIZONTAL BODY POSITION STABILIZATION FLOOR S2206
REACTION FORCE MOMENT NECESSARY TO CONVERGE DIFFERENCE TO ZERO ON THE BASIS OF
DIFFERENCE IN HORIZONTAL BODY POSITION BETWEEN MODELS.

DETERMINE REQUIRED VALUE OF MODEL BODY POSTURE INCLINATION ANGLE STABILIZATION S2208
FLOOR REACTION FORCE MOMENT NECESSARY TO CONVERGE DIFFERENCE TO ZERO ON THE BASIS
OF DIFFERENCE IN BODY POSTURE INCLINATION ANGLE BETWEEN MODELS.

DETERMINE REQUIRED VALUE OF MODEL ANTIPHASE ARM SWING ANGLE STABILIZATION FLOOR S2210
REACTION FORCE MOMENT NECESSARY TO CONVERGE DIFFERENCE TO ZERO ON THE BASIS OF
DIFFERENCE IN ANTIPHASE ARM SWING ANGLE BETWEEN MODELS.

DETERMINE MODEL HORIZONTAL BODY POSITION STABILIZATION MOMENT, MODEL BODY POSTURE ANGLE S2212
STABILIZATION MOMENT, MODEL ANTIPHASE ARM SWING ANGLE STABILIZATION MOMENT, HORIZONTAL
BODY ACCELERATION, BODY POSTURE ANGULAR VELOCITY, AND ANTIPHASE ARM SWING ANGULAR
ACCELERATION SUCH THAT THEY SATISFY RESTORING CONDITIONS.

MODEL MANIPULATION FLOOR REACTION FORCE MOMENT HORIZONTAL COMPONENT S2214
= MODEL HORIZONTAL BODY POSITION STABILIZATION MOMENT
+ MODEL BODY POSTURE ANGLE STABILIZATION MOMENT

DESIRED FLOOR REACTION FORCE MOMENT HORIZONTAL COMPONENT FOR COMPLIANCE CONTROL S2216
= COMPENSATING TOTAL FLOOR REACTION FORCE MOMENT HORIZONTAL COMPONENT M_{dmdxy}
+ MODEL MANIPULATION FLOOR REACTION FORCE MOMENT HORIZONTAL COMPONENT

DESIRED FLOOR REACTION FORCE MOMENT VERTICAL COMPONENT FOR COMPLIANCE CONTROL S2218
= COMPENSATING TOTAL FLOOR REACTION FORCE MOMENT VERTICAL COMPONENT M_{dmdz}
+ FLOOR REACTION FORCE MOMENT VERTICAL COMPONENT BALANCING WITH CORRECTED GAIT

RETURN

FIG. 75

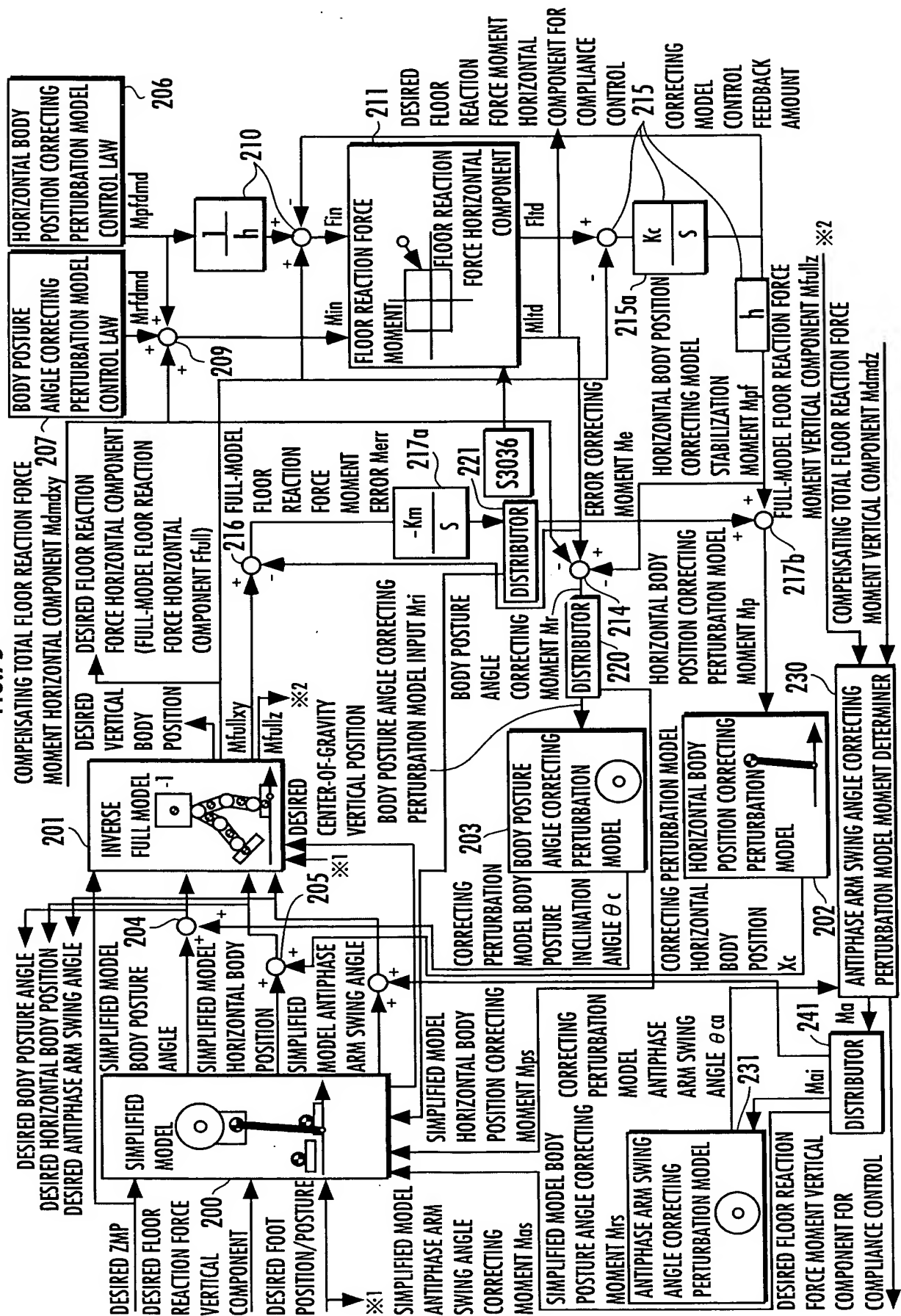


FIG.79

